The Short-Term Effects of Merger on Hospital Operations

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Objective. The short-term effect of merger on three areas of hospital operations–scale of activity, personnel/staffing practices, and operating efficiency–is examined.
Data Sources. Secondary data obtained from the AHA Annual Surveys (1980–1990) were applied to analyze 92 hospital mergers over the period 1982–1989.
Study Design. The study employed a multiple time-series design involving a six-year longitudinal assessment of change in hospital operating characteristics before and after merger, and a parallel analysis of change in a randomly selected group of nonmerging hospitals.
Data Collection. Pooled, cross-sectional data files were constructed. Comparisons were evaluated using paired and two-sample *t*-tests.
Principal Findings. General merger effects occurred primarily in areas related to operating efficiency. Merger resulted in slowing rates of preexisting trends, rather than dramatic improvements in operating practices.
Conclusions. The short-term impact of merger was generally modest but differed by the conditions under which the merger occurred. Specifically, mergers occurring later in the study period and mergers between similarly sized hospitals displayed greater change in operating characteristics than those occurring earlier in the study period and those between hospitals of dissimilar size. Such differences are attributed respectively to increased competitive pressures after PPS and to greater opportunities for consolidation and efficiencies in mergers involving similarly sized hospitals.

Key Words. Merger, hospital operations

The introduction of the prospective payment system (PPS) and increased competition among health care providers have compelled hospitals to engage in more frequent consolidation and merger to improve efficiencies, reduce duplication, and increase survival chances (Finkler and Horowitz 1985; Finkler 1985; Mullner, Longo, and Kubal 1982). Starkweather points out that mergers are unique forms of consolidation that bring all hospital activities under the full control of the merged entity, including support services, management, patient care activities, and professional services (Starkweather 1971, 1981). Other forms of consolidation (e.g., joint ventures or multihospital system affiliation), by contrast, control only a subset of these domains (Starkweather 1971). Thus, in principle, merging entities should be more likely to experience change in their operating practices owing to the comprehensive control of operating elements by the merged organization.

Despite the theoretical appeal of merger as a strategy for effecting change in operating practices of hospitals, and the increasing frequency of merger among hospitals over the past decade, few studies have examined how merger affects hospital operations (Treat 1976; Whittaker 1981; Lynch and McCue 1990). The purpose of this article is to explore empirically the impact of mergers in three areas: scale of operation, operating efficiency, and staffing practices. The analysis focuses specifically on the short-term effect of merger on these areas of operation. This phase of merger, beginning at the point of the legal joining of the merging entities, is particularly critical since it entails the initial combination of resources and begins the process toward full integration (Starkweather 1981). However, this phase frequently involves actions taken to protect established individuals, subgroups, and activities. Such actions may constrain organizations in their attempt to achieve full integration (Anderson 1991; Buono and Bowditch 1985).

The results of these analyses are expected to inform policymakers regarding the likely short-term effects of hospital merger efforts in response to increased competition, prospective payment schemes, and cooperative activities engendered by health care reform. For hospital managers, the study will provide information regarding the operational outcomes of mergers and ways in which such effects may differ as a function of the characteristics of the merging entities.

A major theoretical premise for our study is that hospitals engage in merger to introduce efficiencies and consolidate their operations in order to remain viable and competitive in their markets. We hypothesize, therefore, that the postmerger period will reflect consolidated (reduced) scale of operations, leaner staffing practices, and improvements in operating efficiency

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compared to the period prior to merger. A second theoretical premise is that such changes will be more or less difficult to introduce as a function of different attributes of the merger. Specifically, we anticipate that short-term consolidation and efficiency changes will obtain primarily for mergers involving hospitals of similar ownership and dissimilar size, and for more recent mergers.

The primary research questions addressed in this study are:

1. What changes in short-term operational practices are observed when two hospitals merge?
2. Are changes in operational practices following merger related to the type or conditions of merger (e.g., merger between dissimilarly or similarly sized hospitals)?

This study departs from previous investigations of merger in several ways. First, we evaluate the impact of merger for a relatively large sample of mergers ($N = 92$), thus increasing potential generalizability of the findings (Treat 1976; Whittaker 1981; Mullner and Anderson 1987). Second, the study evaluates merger over a protracted period of time (1980–1990), capturing recent mergers as well as those occurring in earlier periods. The broad time scope of the investigation permits an assessment of differences in merger behavior by period, a potentially important conditioning effect on merger outcomes. Third, the study attempts to distinguish between changes in hospital operational practices resulting from merger and those that may be due to preexisting secular trends. Finally, our study is one of the few that assumes that all mergers are not alike and that the conditions surrounding the merger may either enhance or impede operational change.

THEORY AND HYPOTHESES

Hospital merger is defined as a combination of previously independent hospitals formed by either the dissolution of one hospital and its absorption by another, or the creation of a new hospital from the dissolution of all participating hospitals (AHA 1992). The health services and organizational literature ascribes the reasons for merger to one of two general causes (Finkler 1985; Suter 1985; Chatterjee 1986). First, mergers may occur in order to attain the requisite investment and management base (i.e., critical mass) necessary to acquire costly health technology, increase market share, support desired clinical services, or attract increasingly specialized technical staff. If increasing the scope of activity in order to achieve access to capital and improve the ability to attract other health care resources motivates the merger(s), we would expect little or no consolidation in staffing or service capacity and few improvements in operating efficiency following merger of two or more hospitals.

On the other hand, some have argued that mergers are precipitated by the desire to consolidate services, achieve efficiency, and reduce overbedding and staffing in highly restricted markets (Schwartz and Joskow 1980; Starkweather 1981; Levitz and Brooke 1985; Department of Health and Human Services 1991). If consolidation is a primary motivation for merger, we would expect to see changes in operating practices in those institutions involved in merger. Specifically, we would anticipate reduction in the overall scale of operation, improved operating efficiency, and reduced duplication in staffing in the period following merger.

Unfortunately, it is exceedingly difficult to test the validity of these two theories. First, merger may best be thought of as a process as opposed to a point-in-time event. For example, Treat (1976) described short, intermediate, and long-term effects of hospital merger and noted different operational effects of merger across these three periods. Starkweather (1981), in a conceptual discussion, argued that mergers among hospitals are undertaken in several distinct stages. Such dynamic models suggest that the operational effects of merger may not be evident for some years beyond the point of legally joining two or more entities, or that merger effects may be quite different across different merger stages (Schein 1971; Lubatkin 1983). This presents two difficult methodological problems. First, the time period required to assess all effects of merger may have to be exceedingly protracted, thus limiting the number of available merger events. Second, observing the behavior of merging organizations over time may introduce problems of secular trends as alternative explanations to any observed merger effects. That is, the longer the period of observation, the more difficult it is to attribute any changes to merger itself. Given such constraints, we elected to restrict our analysis to the short-term effects of merger in order to increase both generalizability and internal validity of study findings.

A second important caveat on the two theoretical explanations for merger and their effects relates to the distinction between intent and implementation. We expect that implementing changes in scale of operations, operating efficiency, and staffing practices will be difficult following merger, owing to inertial forces that perpetuate the organizational status quo: vested political interests, disagreement regarding corporate culture and strategic direction, and communication and coordination problems that result from combining two formerly independent entities (Anderson 1991; Jemison and Sitkin 1986; Marks 1982). Difficulties in implementing change, however, may vary systematically by characteristics of the hospitals involved in merger. Specifically, we argue that change in operating scale, operating efficiency, and staffing practices will be more evident when the merger involves hospitals that are (1) dissimilar in size; (2) similar in ownership; and (3) occurring in a more recent, as opposed to an earlier, time period.

SIZE SIMILARITY

Mergers may take place between hospitals that are either similar or dissimilar in size. Asymmetry in size may facilitate consolidation and integration between merging entities based on unequal power distribution. The more powerful hospital will be in a position to exercise greater leverage for operational change. Conversely, integrative changes may be difficult between similarly sized participants as both participants may effectively resist changes that disrupt their current operating practices.

OWNERSHIP SIMILARITY

Mergers involving hospitals with similar ownership may be conducive to effecting operating changes in those institutions. That is, if merging hospitals have compatible ownership and therefore share either a common orientation or set of values, or both, it is relatively easy to establish a new direction for the combined entity and to implement changes that would take the new organization toward common goals. Conversely, merger between hospitals with dissimilar ownership, missions, and/or orientations would require more time and energy to overcome these initial disparities and would likely produce greater resistance to change on the part of either entity. In short, ownership compatibility between merger partners may facilitate operational change in the merged entity.

MERGER PERIOD

Over the time period examined (1980–1990), exogenous pressures such as increased competition, reduced health care dollars, and changes in health care reimbursement compelled hospitals to improve operating efficiency, reduce duplication, and compete effectively in the health care market. For example, merging hospitals may have been at greater risk as PPS was fully implemented because they were no longer able to shift the cost of the merger to Medicare or to generous commercial payers (Manheim, Shortell, and McFall 1989). This suggests that in response to such pressures, mergers occurring in later periods would be more likely to effect short-term operational changes relative to mergers occurring in earlier periods.

METHODS

STUDY DESIGN

The study employs a multiple time-series design with a nonequivalent comparison group (Cook and Campbell 1979). The design is powerful in its ability to control for a variety of threats to internal validity. Of particular importance is the partial control for history effects. If events other than merger affect operating characteristics of hospitals, these effects will be observed in the time series prior to merger. For an alternative event to represent a cause of any observed "merger" effect, it would have to be concurrent with, and not procede, the merger event. This seems unlikely for at least two reasons. First, mergers are profound organizational events that are likely to overwhelm other exogenous events specific to the merger period. Second, our sample mergers occurred over an eight-year period, not at a single point in time. Even if a telling exogenous event took place at the exact point of a particular merger, it is unlikely that it would apply to all or even to most of the mergers, given their staggered distribution across time.

However, to more strictly control for historical effects, we employed a randomly selected comparison group in the analysis. We elected to use a random comparison group, rather than matched hospitals, for three reasons. First, our principal interest was in assessing general, secular trends in the hospital field as an alternative explanation of merger effects. Such trends may not be adequately captured with a nonrandom group of matched hospitals. Second, the focal comparison in the study was between the behavior of merger participants before and after merger, not a comparison of merging and nonmerging hospitals. Thus, selection bias is not a primary issue in the analysis. Finally, matching can lead to spurious results if no obvious matching criteria are present, or when matching criteria suppress or augment actual effects because of their high degree of association with merger (Cook and Campbell 1979; Greenland 1982; Rothman 1986).

SAMPLE AND DATA SOURCES

Our study sample consisted of 194 hospitals that engaged in merger during 1982–1989, resulting in 97 merged facilities. To simplify data analyses, only two-hospital mergers were included in this study, resulting in a final sample of 92 mergers. Although all two-hospital mergers in our sample were validated, we cannot be certain that mergers not reported in our data sources did not occur during the study period. We expect few of these omissions, however, and have no reason to believe that such cases differ systematically from the mergers in our sample.

Listings of hospitals engaging in merger and the resultant entity were obtained from the American Hospital Association (AHA). These files contained names and identification numbers of merging hospitals and of the resulting entities. These files also indicated the year in which the merger was legally consummated. For purposes of our analysis, we made no distinction between a merger, in which two previously independent entities combine to form a new entity, and an acquisition, defined as a situation in which one hospital loses its institutional identity and assumes the identification of the acquiring hospital. Mergers and acquisitions both result in integrated organizations that include managerial support, and professional and clinical activities.

Operating data on merging hospitals were obtained from the AHA Annual Survey of Hospitals (1980–1990), which covers areas related to facilities, services, staffing, finance, and administration. Except for minor modifications, the survey remained unchanged throughout the study period.

For the 92 sample mergers, we obtained operating data on participating hospitals for the three years prior to the merger, and on the resultant facility for the first three years of merger. Assessing hospital behavior over three years in both the pre- and postmerger periods permitted us to generate of reliable operational trends while preserving as many cases of merger as possible (Kralewski et al. 1984). Two exceptions to this approach must be noted. First, because few of the study variables were available in the AHA Survey prior to 1980, we included only two years of premerger data (1980 and 1981) for hospitals engaging in merger in 1982. Second, the 1990 AHA survey was the latest version of this survey available at the time of the current study. Information regarding facilities resulting from mergers occurring in 1989 was therefore collected only for the first two years of the merger (1989 and 1990). Because the number of mergers in 1982 and 1989 (ten and eight, respectively) was relatively small compared to other years, our findings are unlikely to be biased by these "truncated" cases.

A comparison group of 276 nonmerging hospitals was also selected for analysis. This group was randomly drawn from the population of nonmerging hospitals (without replacement) for each study year (Alexander and Morrisey

1988). The number of comparison hospitals drawn was three times the number of merger events. Six years of pooled, time-series data were constructed for all comparison hospitals in a manner comparable to those of the merger sample.

VARIABLE MEASURES

1. Operating Characteristics

Changes in hospital operating characteristics before and after merger were assessed using six variables representing three areas of hospital operations: scale of operation, operating efficiency, and staffing practices. Two measures of each operational area were used in order to capture different dimensions of each area.

Scale of Operation. This was measured by (1) statistical beds–the average number of beds set up and staffed for use; and (2) adjusted admissions–the sum of hospital inpatient admissions and equivalent admissions attributed to outpatient services based on revenue generation.

Operating Efficiency. This was measured by occupancy rate and total expenses per adjusted admission. Occupancy rate is the average proportion of inpatient capacity in use, calculated as the ratio of average daily census to statistical beds. Total expenses per adjusted admission was examined to gauge changes in expenses as a function of differences in patient volume.

Staffing Practices. These were assessed using (1) the number of total personnel, to examine global personnel changes before and after merger, and (2) the number of nurses, to examine changes in clinical staffing. Both personnel categories were the sum of full- and part-time employees, with part-time employees representing one-half of full-time equivalents. Levels of nursing personnel were calculated as the sum of registered nurses, licensed practical nurses, and ancillary nursing personnel. As changes in unadjusted staffing levels may merely reflect changes in operating scale, total personnel and nurses were standardized by average daily census.

To compare hospital operations before and after merger, the mean value of each operating variable was calculated for each period. Calculation of mean values for the premerger period varies depending on the variable considered. For statistical beds and adjusted admissions, mean values were simply summed between the two hospitals to create combined premerger means. Combined mean occupancy rate was calculated as the sum of the mean average daily census values divided by the sum of the mean statistical beds over the three-year period prior to merger. Similarly, combined mean total personnel and nurses per average daily census were calculated as the sums of the mean staffing levels divided by the summed mean average daily census values. Combined mean expenses per adjusted admission was the sum of the mean total expenses divided by the sum of the mean adjusted admissions. Similar calculations for comparison hospitals were performed except that combined values for premerger periods were not required. For hospitals resulting from merger, mean values were calculated over the year of merger and the two following years. When data on operating variables were missing from one of the years in either the pre- or postmerger period, means were computed using the data available for the other two years.

We also examined rates of change for hospital operating characteristics both before and after merger. Change rates were assessed using the slope of means for operating variables for the three years prior to merger (for merging hospitals), or for the first three years of merger (for the resultant hospital). When data from all three years prior to merger were present, slopes were calculated by linear regression. When data from only two years were presented, slopes were calculated by linear interpolation.

2. *Stratifying Variables*

In addition to examining merger effects for all sample hospitals, we also assessed whether or not operating variables show different patterns of change depending on the characteristics of the merger. We therefore stratified hospital mergers in the study sample by three categories: size similarity, ownership similarity, and period of merger.

Size similarity was determined by comparing the bed-size codes of the two merging hospitals. These codes grouped hospitals into one of eight categories: 6–24 beds, 25–49 beds, 50–99 beds, 100–199 beds, 200–299 beds, 300–399 beds, 400–499 beds, and 500 or more beds. For the purpose of stratifying merger, merging hospitals were classified as being of similar size if they were in the same or adjacent bed-size categories. Mergers of hospitals with greater disparities in bed-size categories were classified as having dissimilar size.

Ownership similarity was defined by whether the two merging hospitals had the same or different ownership. Hospital ownership was assigned to one of three categories: government not-for-profit, private not-for-profit, and for-profit.

Three time periods were considered for classifying our study sample: mergers occurring during 1982–1984, 1985–1987, and 1988–1989. This enabled us to determine whether changes related to hospital merger were limited to particular temporal periods, or whether they applied irrespective of historical period.

ANALYSIS

Merger effects were determined through comparisons of levels and rates of change for each operating characteristic (Kralewski et al. 1984; Wheeler, Zuckerman, and Aderholdt 1982). Specifically, we examined (1) differences in levels (means) of operating characteristics for merger participants three years before and three years during and after merger; (2) differences in the rate of change (slopes) for operating characteristics between these periods; (3) the premerger rate of change in operating characteristics, to rule out premerger secular trends as explanations of observed changes in mean levels; and (4) differences between levels and rates of change of merging hospitals and comparison hospitals to identify potential history effects. Note that except for comparison (4), analyses focus on comparing each merging organization with itself.

Accurate interpretation of merger effects requires simultaneous comparisons (Kralewski et al. 1984). Examining means or slopes alone can be misleading. For example, a significant change in means with no shift in slope may simply reflect an ongoing secular trend rather than improvement or deterioration following merger; alternatively, while there may be no change in the mean level, slope shifts may suggest that operating characteristics are actually declining or increasing at different rates because of the merger.

Differences in pre- versus postmerger levels and rates of change were compared using paired *t*-tests. Examination of whether premerger slopes differed significantly from zero was based on a student *t*-test. Means and slopes of the merger group were compared to those of the comparison group using two-sample *t*-tests with weighted standard errors to account for differences in variance.

RESULTS

Table 1 displays the distribution of our merger sample by year of merger, similarity of size, and similarity of ownership. The distribution of our merger sample is generally equal across the study period (1982–1989). The year 1988 witnessed a relatively greater number of mergers (22) whereas 1984 and 1989 saw fewer mergers (six and eight, respectively). Fifty-five percent of the mergers in our sample involved hospitals of similar size, and the rest occurred among hospitals of dissimilar size. Finally, the majority (71 percent) of the merger events occurred among hospitals with similar ownership.

ALL MERGER SAMPLE

Table 2 displays analyses of differences in levels and rates of change for the merger and the comparison groups. These results provide support for our hypothesis that mergers produce short-term improvements in operating efficiency, but little support for the predictions that leaner staffing practices or reduced operating scale result from merger.

The first column of Table 2 indicates that the decline in occupancy rates for merging hospitals between pre- and postmerger periods is most likely a continuation of the significant premerger trend toward declining occupancy in merging hospitals. However, comparison with the nonmerger group indicates that the decline in occupancy levels is significantly less in the merger sample and that neither the differences in slope nor premerger slope differ between the two groups. This pattern suggests that although occupancy rates fell among merging hospitals, the decline was significantly less than that in the comparison group.

For total expenses per adjusted admission, a similar pattern is observed. Merging hospitals experience significant increases in their costs after merger,

Table 1: Distibution of Hospital Merger Sample by Year of Merger, Similarity of Merger Partner Size, and Similarity of Merger Partner Ownership (1982–1989)

	Number of Mergers	*Percent of Sample Mergers*
Year of Merger		
1982	10	11
1983	12	13
1984	6	7
1985	15	16
1986	12	13
1987	12	13
1988	22	24
1989	8	9
Similarity of Merger Partners		
Size		
Similar	51	55
Dissimilar	41	45
Ownership		
Similar	65	71
Dissimilar	27	29

Table 2: Operational Variables Before and After Hospital Merger: Comparisons of Mean and Slope Values–Mergers and Comparison Group

Operational Variable	*Difference†, Mergers (N = 92)*	*Difference§, Comparison Group (N = 276)*	*Difference¶ Merger vs. Comparison Group*
Scale			
1. Beds			
Mean	−39.27***	−5.29**	−33.98***
Slope	9.85	−0.49	10.34
Premerger slope	−7.80*	−0.96	−6.84**
2. Admissions (adjusted)			
Mean	−709.26	34.21	−743.47*
Slope	334.61	75.77*	258.84
Premerger slope	−183.15	−11.29	171.86
Operating Efficiency			
1. Occupancy rate			
Mean	−0.55**	−3.96***	3.41***
Slope	0.97	1.13**	−0.16
Premerger slope	−1.49**	−1.99***	0.50
2. Expenses per adjusted admission‡			
Mean	524.88***	703.16***	−178.28**
Slope	−64.54	2.75	−67.29
Premerger slope	79.51	250.85***	−171.34**
Staffing Practices			
1. Nurses per average daily census (100)			
Mean	20.44***	32.76***	−12.32
Slope	−8.59*	1.29	−9.88
Premerger slope	7.34**	7.89***	−0.55
2. Total personnel per average daily census (100)			
Mean	57.82***	93.50***	−35.68
Slope	−17.60*	9.51	−27.11
Premerger slope	18.34***	23.14***	−4.80

*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$.

†Differences in means and slopes were calculated by subtracting premerger values from postmerger values. Significance of difference was determined using paired *t*-test; *t*-test performed to determine if premerger slope is significantly different from zero.

‡Adjusted for inflation using hospital price index (Freeland, Chulis, Brown, et al. 1991).

§Differences for comparison group hospitals were calculated as in (†) using year of merger as the reference point for specifying periods comparable to pre- and postmerger periods.

¶Differences in changes of means and slopes were calculated by subtracting comparison group values from merger group values. Significance of difference was determined using two sample *t*-test.

even though there are no discernible cost trends in the premerger period. In comparing the changes in means and slopes between merger and nonmerger groups, we note that both levels and premerger slope differences are significantly greater among the comparison group of hospitals. This pattern suggests that increases in the ratio of expenses to adjusted admission among merger hospitals were not as great as they were in the comparison group, and that such differences are attributable to both merger and a strong trend toward higher expenses among the comparison group in the period comparable to premerger. Findings on occupancy rate and expenses per adjusted admission both indicate that merger results in improved operating efficiency relative to nonmerger hospitals, although no such improvement is observed when merging hospitals are compared to themselves.

Preliminary evidence for reduction in scale among merging hospitals is indicated by significant differences in the decline of adjusted admissions and beds when compared to nonmerging hospitals. Note, however, that there are no significant differences in the changes of means or slopes among the merging hospitals on adjusted admissions. Further, there is a significant difference in premerger slope toward bed reduction in the merger group relative to the comparison group. These findings indicate that the observed difference in the change of operating scale between the merging and nonmerging hospitals are likely the result of initial differences between these two groups rather than merger per se.

Finally, the two staffing variables evidence significant differences in slopes between pre- and postmerger periods. For both personnel and nurses per average daily census, differences between pre- and postmerger slopes were negative and significant. Taken alone, this pattern of results would indicate that although mean staffing ratios were higher in the postmerger period, the rate of increase in these two operating variables was blunted as a result of merger. However, direct comparisons between merger and comparison groups reveal no significant slope differences, thus making it difficult to attribute such blunting effects to merger.

ANALYSIS OF MERGER TYPES

The analysis to this point has considered the operational impact of mergers of all types during the study period. This section reports results of analyses based on the conditions under which merger occurs. Three such conditions are examined: mergers of similarly and dissimilarly sized hospitals, mergers between hospitals of similar and dissimilar ownership type, and mergers by different time periods. Because the research question focuses on comparisons of operating characteristics between different types of mergers rather than between merging and nonmerging hospitals, the randomly selected comparison group is not utilized in this phase of analysis. Table 3 reports results of differences in operational variables before and after hospital merger as a function of the three merger attributes.

Size Similarity

Our working hypothesis predicted that it would be easier to effect operating changes in mergers involving hospitals of different size owing to the asymmetry in power between the merging entities. The pattern of results generally contradicted this prediction.

Among mergers between hospitals of dissimilar size, there were three significant differences in mean levels of operating variables that could be attributed to merger: beds (−), nurses per average daily census (+) and total personnel per average daily census (+). It is instructive to note that all of these variables are related to change in capacity or staffing practices, and that all three show significant shifts in level from pre- to postmerger period despite the absence of trends prior to merger.

By contrast, of the five significant differences that could be attributed to merger in the similarly sized hospital group, all but one were results of a blunting effect on a preexisting trend rather than of a shift in the level of the variable from pre- to postmerger period. Results suggest that declines in occupancy rate and adjusted admissions were reduced following merger, while trends toward higher staffing levels (nurses and total personnel) were blunted following merger. Only expenses per adjusted admission were significantly higher following merger, despite the absence of a preexisting trend.

Ownership Similarity

We hypothesized that short-term operational changes would be more likely in mergers involving hospitals of similar ownership owing to compatible cultures, missions, and strategic orientations. Conversely, fewer operational changes would occur in mergers involving hospitals of different ownership, since cultural and mission differences might lead to a greater conflict between merger partners.

Results are largely inconclusive with our hypothesis. The general pattern of findings suggests that mergers between hospitals of similar ownership are no more likely to effect operating changes than mergers involving hospitals of different ownership.

Table 3: Operational Variables Before and After Hospital Merger: Comparisons by Merger Type and Context

	Size Similarity		*Ownership Similarity*		*Merger Period*		
	Difference† *(Similar Size)*	*Difference†* *(Dissimilar Size)*	*Difference†* *(Same Ownership)*	*Difference†* *(Different Ownership)*	*Difference†* *(82–84)*	*Difference†* *(85–87)*	*Difference†* *(88–89)*
Operational Variable	N = *51*	N = *41*	N = *65*	N = *27*	N = *28*	N = *39*	N = *30*
Scale							
1. Beds							
Mean	−51.13***	−23.73*	−47.25***	−19.11	−13.07	−59.27**	−36.87**
Slope	12.69	3.91	12.09	0.82	20.44	6.46	4.56
Premerger slope	−10.51*	−2.51	−9.40*	−1.10	−3.74	−12.57*	−5.19
2. Admissions (adjusted)							
Mean	−1391.91***	242.46	−634.54	−771.77	349.71	−961.94*	−1098.53*
Slope	590.03*	−151.78	149.36	577.75	−142.03	39.28	934.62**
Premerger slope	−363.05*	189.88	−175.25	36.83	−61.94	−128.89	−314.10
Operating Efficiency							
1. Occupancy rate							
Mean	−0.04E−1§	−0.06E−1	−0.01	0.01	−1.94***	−2.12	2.45
Slope	0.027*	−0.01	0.01	0.02	−3.53**	2.10	3.27*
Premerger slope	−0.02**	−0.02E−1	−0.01*	−0.02	0.97	−2.90***	−1.77*
2. Expenses/adjusted admission‡							
Mean	557.69***	497.61***	507.94***	595.77**	244.94*	476.61***	747.29***
Slope	−139.73	33.28	−25.79	−167.88	259.53	23.03	−354.92
Premerger slope	44.32	122.78***	132.64***	70.23**	−196.23	111.36**	216.12***

Continued

Table 3: Continued

	Size Similarity		*Ownership Similarity*		*Merger Period*		
	Difference† *(Similar Size)*	*Difference†* *(Dissimilar Size)*	*Difference†* *(Same Ownership)*	*Difference†* *(Different Ownership)*	*Difference†* *(82–84)*	*Difference†* *(85–87)*	*Difference†* *(88–89)*
Operational Variable	N = *51*	N = *41*	N = *65*	N = *27*	N = *28*	N = *39*	N = *30*
Staffing Practices							
1. Nurses per average daily census (100)							
Mean	21.02**	19.64***	19.74***	22.17*	25.35*	18.51**	19.98*
Slope	−17.15**	3.02	−4.37	−19.04*	−20.43	0.99	−12.62
Premerger slope	10.16**	3.53	5.87*	10.98	16.16	4.08	6.33
2. Total personnel per average daily census (100)							
Mean	66.27***	47.36***	64.31***	43.68**	14.97	71.86***	75.90***
Slope	−33.87**	5.10	−14.02	−26.80	−2.05	−6.72	−43.13*
Premerger slope	26.24***	7.31	17.23**	21.25*	7.06	22.26***	22.78**

$^{*}p \leq .05$; $^{**}p \leq .01$; $^{***}p \leq .001$.

†Differences for means and slopes were calculated by subtracting premerger values from postmerger values. Significance of difference was determined using paired *t*-test. Difference for premerger slope was calculated to determine if it was significantly different from zero using two-tailed *t*-test.

‡Merger between similar sized hospitals is defined as merger between hospitals in the same or adjacent bed-size categories.

§Exponential notation.

Despite the fact that four of the six operational measures display significant mean differences before and after merger, only one might be attributable to the effect of merger itself. In mergers involving hospitals of different ownership, the general trend toward increasing ratios of nurses per average daily census was blunted after the merger. This was evidenced by the significant negative slope difference for this operating variable. In all of the remaining comparisons showing significant mean differences between pre- and postmerger periods, such differences are attributable to preexisting trends.

Merger Period

Our hypothesis suggested that the operational impact of merger would be more pronounced in later periods owing to increased pressures imposed by a fully implemented prospective payment system and increased competition in the hospital industry. Three merger periods were considered: 1982–1984, 1985–1987, and 1988–1989. On the whole, merging hospitals in the latest period displayed more changes and more improvement in operating practices than merging hospitals in the earliest period, thus providing support for our prediction.

In the earliest merger period (1982–1984) only three operational changes could be attributed to merger. In this period, occupancy rate was significantly lower in the postmerger period relative to the premerger period. Further, the negative coefficient for the slope difference indicates that the rate of decline in occupancy rate was actually accelerated by the merger event. Both the mean levels of nurses per average daily census and expenses per adjusted admission were significantly higher following merger, even though no significant trends were evident in these variables prior to merger.

It is instructive to contrast this pattern of findings for the early merger period with the last merger period (1988–1989). During this latest period, changes in four of the six operating variables could be attributed to merger: adjusted admissions, total personnel per average daily census, occupancy rate, and number of nurses per average daily census. Whereas adjusted admissions displayed a significantly lower mean value in the postmerger period, results suggest that this negative trend would have been more pronounced had merger not occurred. Similarly, although total personnel per average daily census was higher in the postmerger period relative to the premerger period, the rate of increase was significantly blunted as a result of merger. Although occupancy rate did not evidence significant differences in means before and after merger, results suggest that premerger trends toward declining occupancy rate were slowed as a result of merger. Only number of beds and nurses per average daily census showed significant change following merger, despite the absence of any premerger trend. Number of beds decreased and number of nurses per average daily census increased.

DISCUSSION

This study examined whether or not short-term operating changes result from the merger of two hospitals. This issue has received increased visibility in light of diminishing health care dollars, increased hospital competition, and growing incentives to increase productivity and efficiency. Results of our analyses suggest that changes in operating practices do occur among merged hospitals. However, such changes are not distributed equally over operating areas such as scale of operation, staffing practices, and operating efficiencies. Instead, operating changes occur selectively in these areas and as a function of specific conditions under which merger occurs.

For mergers of all types, the primary operational areas affected were operating efficiency, occupancy rate, and expenses per adjusted admissions. In the case of both efficiency variables, trends towards inefficiency were arrested somewhat after merger. Similarly, preexisting trends in the decline of occupancy rate were curtailed as the result of merging two hospitals. Although a number of other changes were observed before and after merger, as expressed in mean differences in operating variables, these could not be attributed to merger per se.

Our hypotheses regarding the contingency effects of merging conditions on hospital operating changes received mixed support. Evidence was found for the notion that operating changes resulting from mergers were more pronounced among hospitals merging in later periods than in earlier periods. However, results were contrary to our prediction that operating changes would occur more often in mergers involving hospitals of similar rather than dissimilar size. It is possible that more opportunities exist for merger between similarly sized hospitals. Alternatively, a merger between, say, a $200,000,000 hospital and a $1,000,000 hospital should not affect total combined operating indicators given differences in scale.

The second general observation in our study is that when merger effects do occur, most tend to be expressed in terms of changes in the rate of preexisting trends (slope differences) in operational characteristics of merger participants. Such operational changes differ from those characterized by dramatic turnarounds in scale of operation, personnel practices, or operating efficiency. This type of change may reflect our focus on short-term results of merger. In the short run, merging entities may focus on slowing the rate of preexisting change in operating practices rather than attempting a radical reversal in such practices. Changes may proceed slowly and cautiously until full integration can be achieved.

We have taken pains to distinguish between the effects of merger and those resulting from preexisting trends in operating characteristics of merger partners. Whereas we consider this a strength of the analysis, caution should be exercised in attributing operating changes to either merger or preexisting secular trends. The literature has suggested that merger may not occur at a single point in time but over some period prior to and following the legal joining of participating entities. If so, an alternative interpretation of the "secular trends" effect might be that merging entities may begin to integrate and consolidate well before the official point of merger. Although this scenario is plausible, it is less likely than the argument that the integration process unfolds over a lengthy period following the act of merger. Under this scenario, merger provides a context or impetus for change rather than representing change itself. Support for our interpretation of the secular trends and their effects also comes from changes in the comparison group and the trends in the hospital industry toward downsizing and reduced inpatient volume during the 1980s.

Because secondary data were used, we were unable to ascertain directly the strategic intent of merger in our sample hospitals. This prevented us from addressing directly the issue of why and how changes in operating practices did or did not occur. For example, information was unavailable to discern whether merger occurred to increase scale of operations and thus access to capital and technology, or because of attempts to consolidate and achieve efficiencies in the face of an increasingly competitive health care market.

Further, because of data limitations, our analysis was limited to a few, selected operating characteristics and a limited set of contextual conditions. Future studies should concentrate on other outcomes of merger (both short- and long-term) including changes in the quality of care, financial viability, consolidation in the administrative component of the organization and, perhaps most importantly, survival itself. Similarly, other conditions of merger might be examined. These include the physical proximity of hospitals engaging in merger, the history of the relationship between merging partners (cooperative versus competitive), the influence of other exogenous forces (e.g., community pressure) on merger, and more detailed information on the economic conditions surrounding the merger event.

Several additional qualifications of the analysis and our findings should be noted. First, the possibility exists that size effects may influence changes in scale-related variables (e.g., adjusted admissions). We chose not to control for such effects in order to examine downsizing and consolidation of capacity in our merger sample, irrespective of size differences in the sample. Second, several initial differences were noted between the merger and nonmerger groups that may have affected comparisons. Merging hospitals, relative to the nonmerging group, exhibited significant tendencies toward bed reduction in the premerger period. Nonmerging hospitals, on the other hand, were more likely to experience greater cost increases in the equivalent of the "premerger" period. Such differences suggest that potential merger candidates differ systematically from the general hospital population in some operational areas.

While this study has begun to explore the consequences of merger, much remains to be done. As the number of consolidations and mergers increases dramatically in the hospital industry, and as the historical data on such mergers become available, health services researchers will be in a better position to determine whether these strategies result in more or less efficient delivery of services, reduced or added duplication, and greater or lesser productivity.

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